REMARKS

In the Office Action, claims 1-3 and 12-13 were rejected under 35 USC §103(a) as being unpatentable over Obata et al in view of Riesing. Claims 2-16 were rejected under 35 USC §103(a) as being unpatentable over Obata and Riesing and further in view of Holzer.

Claims 1 and 12 have been amended to quantitatively define the high gas barrier nature of the polymer material by adding the limitation described in claim 2. This is intended to more clearly distinguish the invention from the prior art.

In the final Office Action, the Examiner confirmed that in the Office Action mailed on April 3, 2003, the first sealing lip is 9 and is made of PTFE. Thus the Examiner is relying on Obata for disclosing the first sealing lip 9 made of PTFE. The Examiner is also relying on Riesing for disclosing a lip seal having a liner made of PTFE. Then, to configure the sealing lip of Obata to have a liner as taught by Riesing, as contemplated by the Examiner, would result in a sealing lip made of PTFE lined by a liner made of PTFE.

In this regard, as will be understood from Figure 4, a sealing lip made of PTFE lined by a liner made of PTFE will have a gas permeability approximately ten time higher than the gas permeability of the lip seal claimed in claim 1. Such a sealing lip would not be operable to seal CO_2 gas under an extremely high pressure of about 4-12 MPa which will prevail in a refrigerating

system wherein CO_2 gas is used as the refrigerant, as described in the specification on page 2, lines 23-37.

As reported in Example 1 of pages 11-12 of the specification, the sealing lips made solely of PTFE exhibited CO_2 leakage of 27.2 cm^3 per 24 hours in the sliding test under CO_2 pressure of 50 atm (5.07 MPa).

In contrast, the sealing lips made of nylon with a lining of PTFE according to th invention exhibited CO_2 leakage of only 2.3 cm^3 per 24 hours under the same conditions. Therefore, the sealing capability of the sealing lips according to the invention under a high CO_2 gas pressure is more than ten times higher than that of the sealing lips made solely of PTFE. The unexpectedly high sealing capability of the sealing lips according to the invention is fully shown in Example 1.

Regarding claim 12, the method claimed therein requires the provision for a sealing lip made of a highly gas barrier, non elastomeric, polymer material having a rigidity and having a gas permeability coefficient of less than 1.0×10^{-13} ($cm^3 \cdot cm/cm^2 \cdot sec \cdot Pa$) for carbon dioxide gas under a pressure of 4 MPa. Upon application of a gas pressure higher than about 3 MPa, the non-elastomeric, rigid sealing lip is caused to resiliently undergo elastic deformation to permit the low friction lining made of PTFE to resiliently follow any shaft run-out, the permeation of high pressure gas being prevented by the highly gas barrier nature of the sealing lip.

None of Obata, Riesing and Holzer describes or suggests the use of a sealing lip made of a highly gas barrier, non-elastomeric, rigid polymer material and to subject the rigid sealing lip to a high gas pressure to cause it to resiliently undergo elastic deformation to bring the low friction lining into sealing contact with the shaft.

Based on the foregoing amendments and remarks, it is respectfully submitted that the claims in the present application, as they now stand, patentably distinguish over the references cited and applied by the Examiner and are, therefore, in condition for allowance. A Notice of Allowance is in order, and such favorable action and reconsideration are respectfully requested.

However, if after reviewing the above amendments and remarks, the Examiner has any questions or comments, he is cordially invited to contact the undersigned attorneys.

Respectfully submitted,

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